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95W-5 (Ni/Fe/Co) 合金的低温显微组织和力学性能

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摘要: 分析了95W-5 (Ni/Fe/Co) 合金的粉末冶金工艺特点及低温显微组织与力学性能, 给出了力学性能与温度的关系曲线。通过对合金拉伸试样断口的扫描电镜分析, 揭示了该合金低温力学性能与组织变化的微观本质。结果表明: 95W-5 (Ni/Fe/Co) 合金室温下具有较高的强度及一定的塑性; 该合金低温脆化的主要原因是由于屈服强度随温度的降低而增加, 钨颗粒过早解理及粘结相变形极小引起的; 95W-5 (Ni/Fe/Co) 合金的冷脆性转变温度在-50℃左右, 此时脆性断裂以钨颗粒的自身解理为主。

关键词: 95W-5 (Ni/Fe/Co) 合金; 低温显微组织; 力学性能; 脆化

Low temperature microstructure and mechanical properties of 95W-5 (Ni/Fe/Co) alloy

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Abstract: The characteristics of powder metallurgy, low temperature microstructure and mechanical properties for 95W-5 (Ni/Fe/Co) alloys were studied, the relation curves between mechanical properties and temperature were provided. After analyzing the tensile fracture of the alloy with SEM, the microcosmic essential of diversification of this alloy was discovered by discussing low temperature microstructure and mechanical properties. The results indicate that the alloy has much higher strength and certain plasticity. The main reason for low temperature embrittlement is that the yield strength increases with temperature dropping, the tungsten particles cleave prematurely and the binding phases deform hardly. The transition temperature of 95W-5(Ni/Fe/Co) alloy is about -50℃, at which the embrittlement mainly results from the cleavage of tungsten particles.

Key words: 95W-5(Ni/Fe/Co)alloy; low temperature microstructure; mechanical property; embrittlement

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